

REMARKS

Claims 40, 42-50, and 53 are pending in the present application. Claims 1-39, 41, 51, 52, and 54-67 were previously canceled. Claims 40, 44-47, and 53 have been amended herein. No new matter has been added.

I. AMENDMENTS

A. Specification

Applicant has amended paragraph [0028] as suggested by the Examiner in the Office Action.

B. Claims

Claims 40 and 53 were amended to clarify the language of the claims. The phrase, “remains with” was replaced with “results in” to describe the invention in a more grammatically correct manner. No change in the scope of the claims was intended. Furthermore, no new matter was added.

II. CLAIM REJECTIONS – 35 U.S.C. § 112

Claim 53 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has addressed the Examiner’s rejection by amending claim 53 as noted above.

III. CLAIM REJECTIONS – 35 U.S.C. § 103

In *Graham v. John Deere Co. of Kansas City*, the Supreme Court set out a framework for applying the statutory language of §103. 383 U.S. 1 (1966). The Court stated:

Under 35 U.S.C. §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs,

failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. *Id.*, at 17–18.

The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. *KSR Int’l Co., v. Teleflex, Inc.*, 550 U.S. ____ (2007).

Patents for obvious combinations must generally be disallowed because a “patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men.” *Great Atlantic & Pacific Tea Co., v. Supermarket Equipment Corp.*, 340 U. S. 147, 152 (1950). However, when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious. *United States v. Adams*, 383 U. S. 39, 51-52 (1966). Moreover, no holding or doctrine diminishes the necessity of the combined teachings or obvious elements teaching or suggesting each and every limitation of the claimed invention.

A. Claims 40 and 44-50

Claims 40 and 44-50 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Doi, *et al.* (U.S. Patent No. 5,527,647, hereinafter “*Doi*”), in view of Tanaka, *et al.* (U.S. Patent Publication No. 2002/0022184, hereinafter “*Tanaka*”) and either Hasegawa, *et al.* (U.S. Patent No. 6,677,107, hereinafter “*Hasegawa*”) or Itoh (U.S. Patent Publication No. 2003/0184721, hereinafter “*Itoh*”), further in view of either Dove, *et al.* (U.S. Patent No. 5,939,225, hereinafter “*Dove*”) or Mitsui, *et al.* (U.S. Patent No. 6,242,138, hereinafter “*Mitsui*”), and further in view of Chen (U.S. Patent No. 6,274,281, hereinafter “*Chen*”).

Claim 40, as amended, requires:

[O]btaining a prefabricated mask blank designed for use with a light of a first wavelength λ_0 , the prefabricated mask blank comprising:
a transparent layer, and
an attenuating and phase-shifting layer (attPS layer) formed on the transparent layer, the attPS layer having an initial attPS-layer thickness D_0 , and
patterning and adapting the prefabricated mask blank to be an

adapted-patterned mask for use with light of a second wavelength λ_2 , ...
the patterning and adapting comprising:
reducing the attPS-layer thickness of the attPS layer to a
first attPS-layer thickness D_1 at dark areas, and
patterning and etching the attPS layer to form the clear
areas

Thus, claim 40 requires beginning with a prefabricated mask blank that already has a transparent layer and an attPS layer where the mask blank is designed for use with a first wavelength. This prefabricated mask blank is then patterned and adapted for use with a different wavelength by reducing the thickness of the attPS at some locations of the dark areas, and patterning and etching the attPS at other areas to form the clear areas.

In cobbling together his rejection with bits and pieces of various relevancy from seven different patents and published applications, the Examiner attempts to show a *prima facie* case of obviousness of the invention described in claim 40. However, regardless of the various bits and pieces of the seven references that the Examiner has cited to, their combination does not even teach or suggest all of the claim limitations required in claim 40.

The Examiner admits that *Doi* does not teach: (1) an initial thickness D_0 of the attPS layer that is suitable for a first wavelength of which thinning would provide an attPS layer suitable for a second, smaller/shorter wavelength; (2) that the second thickness D_3 remains at the clear areas of the attPS layer, where D_3 is less than the previous thickness, D_1 ; and (3) that the initial thickness of the attPS layer is actually on a prefabricated mask blank. Office Action, p. 5. In order to cure these multiple deficiencies in *Doi*, the Examiner offers various multiple and optional combinations of *Tanaka*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen*. Office Action, pp. 5-10.

In response to deficiency (3), the Examiner offers either *Hasegawa* or *Itoh* to show that it is known for a prefabricated mask blank and a resulting patterned mask to be fabricated separately and, sometimes, by different companies or locations. Office Action, p. 5. Applicant would note, however, that the language of claim 40 does not require the prefabricated mask blank to be fabricated separately or by a different company. Applicant agrees that it is well known that prefabricated mask blanks may be made by various different entities, including the

same mask/chip manufacturer, and may be made at different times or locations than the final patterned mask. Thus, the proffered teachings of *Hasegawa* and *Itoh* are irrelevant to the patentability of claim 40.

The Examiner next offers *Tanaka* to teach various different examples of the relationships between mask manufacturers, blank manufacturers, mask reclaiming, and the like. Office Action, pp. 5-6. The Examiner also offers *Tanaka* and *Dove* to provide explanation of the science behind attenuated phase-shifting masks. Office Action, p. 6. The sum of the science recited by the Examiner is that a thicker attenuation layer accommodates a longer/larger wavelength than a thinner attenuation layer. The Examiner concludes that:

it has been known for some time that an attPS layer at a first thickness (analogous to instant initial thickness D_0) that is suitable for a desired transmittance (e.g., $T = 5\%$ to 15% , etc.) at a first wavelength (analogous to instant λ_0) ***could be made suitable*** for the same desired transmittance at a second wavelength (analogous to instant λ_1) that is shorter than the first wavelength (reading on $\lambda_1 < \lambda_0$) by simply reducing the thickness of the attPS layer, ***as taught by Dove et al.*** Office Action, p. 6. (citations omitted) (emphasis added).

Thus, the Examiner asserts that *Dove* teaches reducing the thickness of a mask blank that is suitable for a first wavelength in order to make is suitable for handling a second shorter wavelength. However, on inspection of *Dove*, *Dove* does not, in fact, teach this limitation, as claimed by the Examiner. *Dove* involves the thin film materials used in preparation of attenuating phase shift masks. Title, Specification, Col. 1, lns 15-41. It does not consider or discuss mask reclamation or refurbishment of such masks. Therefore, there is no discussion or suggestion of changing the mask from one thickness intended for a first wavelength into another thickness intended for a second, smaller wavelength. Instead, *Dove* describes experimental results that indicate what transmission characteristics exist for the inventive films based on different thicknesses. Therefore, at most, *Dove* supports the science that thicker attenuation layers are suitable for longer wavelengths.

Neither claim 40, nor the claimed invention in general, attempts to patent the scientific principle that thicker attenuation layers are more suitable for longer wavelengths than thinner attenuation layers. As such, *Dove* does not, as the Examiner suggested, support the teaching and

limitations of claim 40. Accordingly, the combined teachings of *Doi*, *Tanaka*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen* do not teach or suggest each and every limitation of claim 40.

Similar to *Dove*, *Mitsui* also does not consider or discuss mask reclamation or refurbishment of masks and mask blanks. Therefore, there is no discussion or suggestion of changing the mask from one thickness intended for a first wavelength into another thickness intended for a second, smaller wavelength. Instead, as in *Dove*, *Mitsui* supports the science behind thicker attenuation layers supporting longer wavelength light than thinner layers.

Tanaka, on the other hand, is the only reference out of the references cited by the Examiner that discusses mask blank reclamation in any manner. As noted by the Examiner, *Tanaka* gives several examples of the different types of businesses involved in mask blank manufacturing and reclamation, as well as the typical scenarios that involve these various types of businesses. At most, *Tanaka* describes in each scenario how original masks that either do not meet defect inspection or that are used are then completely stripped before reclamation (whether the stripping is performed at the mask user company, the mask manufacturer, or the mask reclaiming company). Again, as in *Dove* and *Mitsui*, *Tanaka* provides additional support for the science of the relationship between thickness and wavelength. However, while *Tanaka* clearly recites this scientific relationship, there is no teaching or suggestion that the attenuation layers of the masks are modified in parts to accommodate a different wavelength. Thus, there is no teaching or suggestion that would support a *prima facie* case of obviousness in combination with *Doi*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen*. Accordingly, claim 40 is allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejection of claim 40 be withdrawn.

Claims 44-50 depend from claim 40 and inherit all of the limitations of claim 40. Accordingly, claims 44-50 are allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejections of claims 44-50 likewise be withdrawn.

B. Claims 42-43 and 53

Claims 42-43 and 53 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Doi*, in view of *Tanaka* and with *Hasegawa* or *Itoh*, further in view of either *Dove* or *Mitsui*,

further in view of *Chen* and further in view of Jin, *et al.* (U.S. Patent No. 6,524,755, hereinafter “*Jin*”).

Claim 53, as amended, requires “patterning and adapting the prefabricated mask blank to be an adapted-patterned mask for use with light of a second wavelength ...”, similar to the limitation from claim 40. As noted above, the combination of *Doi*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen* does not teach or suggest this limitation. The Examiner further admits that the combination of these references does not teach the specific equations that are claimed, and offers *Jin* to cure this deficiency. However, even with the addition of the eighth reference, *Jin*, to the above seven-way combination, the combination does not cure the deficiency noted above with regard to claim 40. Thus, the combination of *Doi*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, *Chen*, and/or *Jin* still does not teach or suggest each and every limitation of claims 40 and 53. Accordingly, claim 53 is allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejection of claim 53 be withdrawn.

Claims 42-43 depend from claim 40 and inherit all of the limitations of claim 40. Accordingly, claims 42-43 are also allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejections of claims 42-43 likewise be withdrawn.

In view of the above, Applicant respectfully submits that the application is in condition for allowance and request that the Examiner pass the case to issuance. If the Examiner should have any questions, Applicant requests that the Examiner please contact Applicant's Attorney at the address below. In the event that the enclosed fees are insufficient, please charge any additional fees required to keep this application pending, or credit any overpayment, to Deposit Account No. 50-1065.

Respectfully submitted,

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Date

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